

facilities. But I do absolutely deny that there is the smallest sign that in the production of these germinating ideas of science we have shown any inferiority, either to our relations across the Atlantic or to Germany, which I may remind the assembly has for many generations pursued this State-endowing process of applying science to industry. That we are behind Germany in that way I do not deny. Germany had a technical university, or gave technical teaching, I think, as far back—I am refreshing my memory—as the end of the eighteenth century, if not before. Of course, the general system of thought in Germany, the habits of the people and the Government in this respect places them at a great advantage as compared with us as far as the endowment of universities can help a nation, as I doubt not it can, in the industrial struggle. But my point is that mere endowment of universities will not, I think, add greatly to the output of original works of the first quality. What, then, will it do? It will do, or may help to do, what is, perhaps, now more important. It will provide an education which will render fit for industrial work all persons who, without university education, would be very ill equipped indeed. I concur with all the speakers to-day that there is a great need—a great financial need—both in the new and the old universities for help towards this object. But I would beg to point out that there is even a greater necessity than a well equipped university—that is, that capitalists should be prepared to realise what we realise in this room—the necessity of giving employment to those whom these universities are to turn out. I was much struck by an observation of Sir William White's. He pointed out that we possess most of the ships of the world—that we are the largest shipbuilders in the world—and yet he said that Germany has an incomparably larger number of students, far better machinery for educating these students, and more men occupied in the shipbuilding yards; and what Germany has done the United States are doing. One of two things is clear. Either our shipbuilders think this qualified class is necessary or they do not think so; or else they find British students, even though turned out in smaller quantities, are sufficient for their purpose, or they employ American and German students for their works. Are our manufacturers convinced that they get a better man if they get one who has been to a university? Or do they think that if a young fellow wants to become one of the captains of industry he should begin early in life? I think there is some evidence to show that they prefer the older course; and I should suggest they are wrong; and if they are wrong you must convince them they are wrong, otherwise there will be no advantage in turning out qualified students, for they will be content to use the man who acquires his training by actual day-to-day labour on the ship, but is not qualified by these higher scientific attainments which are more and more becoming necessary.

One other thing we want, and that, I think, is the creation of positions which will enable a man who has exceptional gifts of originality in science to devote his life to the subjects of his predilection so as not to be driven to another kind of life in which he will not be able to render the full service of which he is capable to his country. In Germany certainly—I am not sure about the United States—such positions exist to a far greater extent than in this country. In the main they must be attached to the universities. I cannot conceive any more admirable use of any funds which the universities can command than the increase of the number of such positions.

In the course of his remarks, the Chancellor of the Exchequer said:—

It would be of some assistance to those who may have to decide in future when money is available if the universities would consider to what extent they are willing to come under control if they receive grants, to what extent the State is to have a voice in fixing the fees of the students, to what extent it is to direct or influence the teaching, whether it is to allocate its assistance to promote special branches of study, or whether it is desired to make every university complete in itself. Some further exposition of their views would make it easier to deal with this question when the time comes for dealing with it.

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THE MEETING-PLACE OF EAST AND WEST.¹

THE publication of Dr. Stein's preliminary report to the Royal Geographical Society and of his own personal narrative of his explorations among the "sand-buried ruins of Khotan" is one of the most important archaeological events of the year 1903. For the full scientific publication of the whole of his discoveries by the Indian Government we must perforce wait awhile, but we have all that is needed to enable us to form a general idea of them in the interesting and well published volume which lies before us.

Chinese Turkestan hardly sounds as if it were a land of very great interest, yet, as a matter of fact, it is historically one of the most interesting countries in the world. It is not a comfortable country: merely a string of oases half overwhelmed by a devouring desert of shifting sands, the great Taklamakan, and barred off from the rest of the world by huge and impassable mountains, scorchingly hot in summer and frozen by Arctic cold in winter. Yet these remote wilds have seen one of the most interesting phenomena of history, the meeting together of the civilisations of China, of India, and of Europe; here the antique culture of China had in the early days of the Roman Empire already been brought into contact with Graeco-Roman civilisation, and we see the result of the meeting of the two, or, including India, three streams of civilisation in the mixed culture of Turkestan in the early centuries of the Christian era, which Dr. Stein has brought to light.

In those days Chinese Turkestan was the bridge between west and east; from west to east journeyed Roman merchants to buy the precious silk of Serica, and Persian ambassadors or fugitive princes passed seeking the assistance of the mighty Emperor of China; from east to west Chinese armies marched through Turkestan into the basins of the Oxus and Jaxartes, and even reached the Caspian, and Chinese pilgrims, like Fa-hien and Hiuen-Thsang, passed the fanes of Khotan on their way to the holy places of Buddhism in India; traffic to and fro was continuous, and the oases of the Taklamakan could maintain many famous cities, rich temples, and monasteries of renown.

In those days of her importance, as still in these of her desolation, eastern Turkestan was under the political hegemony of China. Legends, indeed, ascribe a remote date B.C. to the first entry of the Chinese into Kashgaria, but since real history (as apart from annals which have not yet been critically sifted) can hardly be said to begin for China before the reign of the great reformer Tsin Chi-Hwangti (B.C. 250), "the burner of the books," we are probably right in assigning the first Chinese occupation to the early days of the Han dynasty, under the emperor Han Wu-ti (B.C. 100), and its first real conquest to the famous General Pancho, who is said to have carried the Chinese arms as far west as the Caspian, and to have attempted to open up direct relations with the Romans (about A.D. 100). Henceforward Kashgaria remained nominally tributary to China; but though individual emperors asserted their authority in the far west from time to time, the country does not seem to have been regularly organised as a Chinese possession until the reign of the great Emperor Tai-tsung, the first monarch of the T'ang (A.D. 634). Under his equally powerful son Kao-tsung we find Chinese viceroys installed in Turkestan, who entered into regular relations with the peoples of the west. The last Sassanian King of Persia, Yazdijird, communicated with them, demanding Chinese assistance against the conquering warriors

¹ "Sand-buried Ruins of Khotan; Personal Narrative of a Journey of Archaeological and Geographical Exploration in Chinese Turkestan." By M. Aurel Stein. Pp. x+503. (London: Hurst and Blackett Ltd., 1904.) Price 7s. 6d. net.

of Islâm, who were now overrunning his kingdom, but Kao-tsung refused to attack the Arabs. Firuz, a son of Yazdijird, fled to the Chinese court at Si-ngan-fu, and Kao-tsung proclaimed him King of Persia after the murder of Yazdijird. He was, however, never able to enter into possession of his kingdom, the Arab conquerors of which sent a formal embassy to the Chinese Emperor four years later (A.D. 655).

Thus Chinese Turkestan served as a bridge between east and west in the days of the great T'ang.

Since the period of the T'ang, Kashgaria has always remained nominally subject to China, and, despite the victory of the western religion of Muhammad over Buddhism, Chinese civilisation has always retained it in its *Kultukreis*; the Chinese authority has always stood for order and for civilisation, and whenever, as in the years of independence under Yakûb Beg during the 'seventies of the nineteenth century, Islâm has succeeded in ousting the infidel rulers of the land, utter anarchy and barbarism has resulted. The defeat of the Muhammedans by the Chinese general Liu Kin-tang in 1878 was a victory for civilisation. To-day Chinese authority is more in evidence in Kashgaria and more firmly upheld than at any time since the days of the T'ang. The whole story of the retention of Kashgaria, not merely as an outpost of Chinese civilisation, but actually as a Chinese possession, throughout history, is an interesting testimony to the real civilised energy and organising power of the Chinese, as well as to their dogged persistence in pursuing their ends.

Chinese Turkestan is, then, a land of remarkable historical interest. Further, it is, like Egypt, a land in which archaeological excavation would be likely to reap rich harvests, for here, as in Egypt, we have two factors which are of inestimable service in preserving the relics of the past intact—dryness and desert sand. The sand covers and protects, the dryness preserves. Hence it is that systematic excavations in the Egyptian manner, now for the first time essayed in Turkestan, have yielded such important results to Dr. Stein. Sven Hedin had already reported the existence of ancient remains in the Taklamakan, and Dr. Stein has explored and excavated them, bringing back with him an invaluable collection of relics of the early civilisation of this strange land, the bridge between west and east. His finds belong mainly to two distinctly marked periods, the third and eighth centuries A.D. The most important of the earlier sites is that in the desert north of Niya, away to the east of Khotan. Here was excavated a regular town of wooden buildings half buried in the sand, with the remains of the trees of its ancient orchards still standing around it. The date of the settlement is given by a document of the reign of the Emperor Tsin Wu-ti, of the Later Tsin (A.D. 265-290). Among the inhabitants Chinese officials were probably included, but the majority seems to have been of Indian origin. This is shown by the discovery of numbers of wooden tablets and parchments inscribed with Indian Kharoshthi writing. These are chiefly reports to the Indian rajas who governed the country. From this we see that the tradition of an Indian conquest of Kashgaria in remote days is founded on fact. That this Indian kingdom formed a road by which the culture of the west penetrated to the east there is no doubt. At Niya, indeed, has been found a striking confirmation of this; five hundred years after Alexander, we find in Turkestan an Indian letter sealed with a Chinese and with a Greek seal side by side! Greek intagli were in common request in this remote Chinese dependency, and the influence of the art of Gandhâra on that of Khotan is very evident from the numerous small objects collected by Dr. Stein on the

site of Yotkan, the ancient representative of Khotan-town. The question as to how far Chinese art is really indebted, through the medium of Khotan and Gandhâra, to that of Greece has, apparently, yet to be worked out.

The other excavated sites are later in date. The miscellaneous antiquities from Yotkan partly bridge over the gap between the period of Niya and the period of Dandan-Uiliq, the most important of the later sites; and the great Rawak Stupa in the Yurung-kash district, which has yielded to Dr. Stein material of the most important kind for the history of early Buddhist art, belongs to the intermediate period. Ranged along the base of this *stupa* is a series of colossal stucco figures in alto-rilievo, representing Buddha's or Bodhisattvas (Fig. 1), and attendant Arhats, these last sometimes represented as grouped in



FIG. 1.—Rilievo Statue of Bodhisattva on South-west Wall, Rawak Stup Court. From "Sand-buried Ruins of Khotan."

the halo of a great Buddha. These remarkable examples of Buddhist art were mostly too bulky and delicate to be removed, and so were re-buried by the explorer after a complete series of photographs had been taken of them. Many of these are published as illustrations to chapter xxx. of Dr. Stein's book.

Dandan-Uiliq is a site outwardly much resembling Niya, which Dr. Stein afterwards excavated, and has yielded, like Niya, many written records, but of course of later date and written in different languages and scripts. In some cases these are still of Indian origin. When the script is Brahmi, the language is sometimes Sanskrit, sometimes an unknown tongue, no doubt the native Indo-Scythic of Turkestan, the language of the *Yue-tchi*. The writing is usually upon paper, less usually on wood. The contents of the Brahmi documents are religious. Civil records, analogous to the Kharoshthi tablets of Niya, are chiefly Chinese. The settlement was, in fact, a Chinese Buddhist monastery,

and its ancient name was Hu-kwo. The Chinese documents date to the end of the eighth century, long after the Indian kingdom was extinct, and when the Chinese dominion, which had been triumphantly re-asserted by T'ang Tai-tsung, was seriously threatened by the inroads of the "Ta-Fan" or Tibetans. Actual Tibetan relics were discovered at Dandan-Uiliq.

Larger antiquities were also discovered here, chiefly Buddhist reliefs of stucco, and, more interesting still, frescoes which give us an unlooked-for insight into the art of Khotan at this period. Exhibited in the Chinese section of the British Museum is a remarkable fresco from Dandan-Uiliq, one of the most important of Dr. Stein's discoveries, representing two equestrian figures, with their costume most carefully depicted. This is not illustrated in Dr. Stein's book, and the omission is to be regretted, as the picture is one eminently calculated to interest the general reader for whose use the "Sand-buried Ruins of Khotan" is chiefly intended.

Another site, beyond Niya, at Endere, has yielded



FIG. 2.—Eroded Ranges of the Kuen-lun, seen from above Yagan-Dawan. From "Sand-buried Ruins of Khotan."

remains of the same date as those from Dandan-Uiliq. This place, Endere, is the most easterly point which Dr. Stein reached in his explorations. It is distant from Khotan some 250 miles, and from Kashgar no less than 550 miles. This fact alone gives some idea of the extent of ground which Dr. Stein covered in his rapid journeyings. His explorations were indeed carried out with remarkable energy, and their great success is the fitting reward of this energy and pluck. For it must be remembered that much of Dr. Stein's work was carried out in the intense cold of a Kashgarian winter, when the thermometer often fell to below zero Fahrenheit in the explorer's tent, when it was hardly possible to hold a pen for the cold, and even sleep was sometimes banished by its intensity. Under these extreme conditions Dandan-Uiliq and Niya were excavated. If we add to these rigours the difficulties of the journey from India over the Pamir passes, we gain some idea of what Dr. Stein has done. His mission has succeeded beyond his own most sanguine expectations, and the Indian Government has indeed served the cause of science well in sending him to Turkestan.

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Incidentally Dr. Stein carried out very important surveys of the Kuen-Lun range (Fig. 2), and connected his own surveys with the trigonometrical survey of India, thus definitely fixing the exact geographical position of Khotan. Also he was enabled to do a great service to archaeology by detecting and exposing the remarkable forgeries of ancient documents in "unknown scripts," the work of a clever rascal named Islam Akhun and a few confederates, which had been sold to travellers as genuine antiques, and had long mystified the learned into whose hands they had come. It was the appearance in India of these forgeries (together with a few genuine relics from Dandan-Uiliq, which had given the forger the idea of his deception) which first impelled Dr. Stein to the systematic exploration of the ruined "cities" from which they were said to have come. He has now cleared up the mystery: we now know what is genuine in the way of written documents from Turkestan and what is not. But, above all, Dr. Stein has discovered really new archaeological material in the Kharoshthi tablets from Niya and in the

Brahmi documents in a non-Indian tongue from Dandan-Uiliq. To students of Buddhism the relics of religious art from Dandan-Uiliq, the Rawak Stupa, and Yotkan will provide material for very important work.

H. R. HALL.

BRITISH ASSOCIATION MEETING AT CAMBRIDGE.

IN a former article (NATURE, April 21), a preliminary forecast was given of the local arrangements for the meeting of the British Association, to be held at Cambridge from August 17 to 24. The programme is now in an advanced state of preparation, and copies may be obtained after July 25 on application to the local secretaries at Cambridge. It may be of interest to give a short account of the arrangements in amplification of the incomplete summary already published.

It is expected that meetings of a sub-committee appointed by the International Meteorological Committee at Southport in September, 1903, to combine and discuss meteorological observations from the point of view of their relations with solar physics, will be held at Cambridge during the session of the association. The committee consists of twenty-two members, of whom eighteen represent the observatories or meteorological institutions of the Continent and America. The primary object of the meeting in Cambridge will be to constitute the organisation of the committee, and prepare a scheme of operations. The members of the committee will take part in the proceedings of Section A, particularly the subsection which deals with cosmical physics, under the presidency of Sir John Eliot, F.R.S.

The conference of delegates of corresponding societies will meet on Thursday, August 18, and Tuesday, August 23, at 3 p.m., in the large lecture-room, Gonville and Caius College.

Mr. Balfour will assume the presidency, and deliver an address in the Corn Exchange on August 17, at 8.30 p.m. A plan of the Corn Exchange may be seen in the reception room, and reserved seats secured up to 6 p.m. on Wednesday, August 17. For the con-